

CLAIMS

The subject matter claimed is:

1. A textured whey protein product comprising a thermoplastic extrusion product of a composition comprising about 1-80% by weight of a food grade protein and about 20-99% by weight of an edible polysaccharide, wherein the food grade protein comprises at least about 25% by weight of whey protein.
2. The textured whey protein product of claim 1 wherein the composition comprises about 15-65% by weight of the food grade protein.
3. The textured whey protein product of claim 1 wherein the composition comprises about 16-48% by weight of the food grade protein.
4. The textured whey protein product of claim 1 wherein the food grade protein further comprises up to about 75% by weight of plant proteins, animal proteins, microbial proteins, or mixtures thereof.
5. The textured whey protein product of claim 4 wherein the food grade protein comprises plant proteins selected from the group consisting of wheat proteins, rice proteins, soy proteins,

corn proteins, legume proteins, and mixtures thereof.

6. The textured whey protein product of claim 4 wherein
the food grade protein comprises wheat protein.

7. The textured whey protein product of claim 4 wherein
5 the food grade protein comprises rice protein.

8. The textured whey protein product of claim 4 wherein
the food grade protein comprises soy protein.

9. The textured whey protein product of claim 4 wherein
the food grade protein comprises corn protein.

10. The textured whey protein product of claim 4 wherein
the food grade protein comprises legume protein.

11. The textured whey protein product of claim 4 wherein
the food grade protein comprises casein.

12. The textured whey protein product of claim 4 wherein
15 the food grade protein comprises blood protein.

13. The textured whey protein product of claim 1 wherein

the food grade protein comprises at least about 50% by weight of whey protein.

14. The textured whey protein product of claim 1 wherein the edible polysaccharide is a member selected from the group 5 consisting of starches, cellulosics, dietary fibers, and mixtures thereof.

15. The textured whey protein product of claim 14 wherein the edible polysaccharide is a starch selected from the group consisting of cornstarch, potato starch, rice starch, tapioca 10 starch, bran starch, soy starch, modified variants thereof, and mixtures thereof.

16. The textured whey protein product of claim 15 wherein the edible polysaccharide is cornstarch.

17. The textured whey protein product of claim 14 wherein 15 the edible polysaccharide is a cellulosic selected from the group consisting of celluloses, modified celluloses, and mixtures thereof.

18. The textured whey protein product of claim 14 wherein the edible polysaccharide is a dietary fiber selected from the

group consisting of maltodextrin, inulin, fructo-
oligosaccharides, pectin, guar gum, and mixtures thereof.

19. The textured whey protein product of claim 1 wherein
the composition further comprises a calcium salt.

5 20. The textured whey protein product of claim 19 wherein
the calcium salt is a member selected from the group consisting
of calcium carbonate, calcium chloride, calcium gluconate,
calcium lactate, and mixtures thereof.

10 21. The textured whey protein product of claim 20 wherein
the calcium salt is calcium chloride.

22. The textured whey protein product of claim 1 wherein
the composition further comprises a pH-adjusting agent.

23. The textured whey protein product of claim 1 wherein
the whey protein comprises sweet whey solids.

15 24. The textured whey protein product of claim 1 wherein
the whey protein comprises a whey protein concentrate.

25. The textured whey protein product of claim 1 wherein

the whey protein comprises a whey protein isolate.

26. The textured whey protein product of claim 1 wherein
the whey protein is a member selected from the group consisting
of sweet whey solids, whey protein concentrate, whey protein
5 isolate, and mixtures thereof.

27. A method for making a textured whey protein product
comprising:

(a) preparing a composition comprising about 1-80% by
weight of a food grade protein and about 20-99% by weight of an
10 edible polysaccharide, wherein the food grade protein comprises
at least about 25% by weight of whey protein;

(b) thermoplastically extruding the composition under
conditions of temperature and pressure such that the composition
is melted and cooked to result in an extrudate; and

15 (c) drying the extrudate to result in the textured whey
protein product.

28. The method of claim 27 further comprising heating the
textured whey protein product to cause expansion thereof.

29. The method of claim 27 wherein the composition
20 comprises about 15-65% by weight of the food grade protein.

30. The method of claim 27 wherein the composition comprises about 16-48% by weight of the food grade protein.

31. The method of claim 27 wherein the food grade protein further comprises up to about 75% by weight of plant proteins,
5 animal proteins, microbial proteins, or mixtures thereof.

32. The method of claim 31 wherein the food grade protein comprises plant proteins selected from the group consisting of wheat proteins, rice proteins, soy proteins, corn proteins, legume proteins, and mixtures thereof.

10 33. The method of claim 31 wherein the food grade protein comprises wheat protein.

34. The method of claim 31 wherein the food grade protein comprises rice protein.

15 35. The method of claim 31 wherein the food grade protein comprises soy protein.

36. The method of claim 31 wherein the food grade protein comprises corn protein.

37. The method of claim 31 wherein the food grade protein comprises legume protein.

38. The method of claim 31 wherein the food grade protein comprises casein.

5 39. The method of claim 31 wherein the food grade protein comprises blood protein.

40. The method of claim 27 wherein the food grade protein comprises at least about 50% by weight of whey protein.

10 41. The method of claim 27 wherein the edible polysaccharide is a member selected from the group consisting of starches, cellulosics, dietary fibers, and mixtures thereof.

15 42. The method of claim 41 wherein the edible polysaccharide is a starch selected from the group consisting of cornstarch, potato starch, rice starch, tapioca starch, bran starch, soy starch, modified variants thereof, and mixtures thereof.

43. The method of claim 42 wherein the edible polysaccharide is cornstarch.

44. The method of claim 41 wherein the edible polysaccharide is a cellulosic selected from the group consisting of celluloses, modified celluloses, and mixtures thereof.

45. The method of claim 41 wherein the edible polysaccharide is a dietary fiber selected from the group consisting of maltodextrin, inulin, fructo-oligosaccharides, pectin, guar gum, and mixtures thereof.

46. The method of claim 27 wherein the composition further comprises a calcium salt.

47. The method of claim 46 wherein the calcium salt is a member selected from the group consisting of calcium carbonate, calcium chloride, calcium gluconate, calcium lactate, and mixtures thereof.

48. The method of claim 47 wherein the calcium salt is calcium chloride.

49. The method of claim 27 wherein the composition further comprises a pH-adjusting agent.

50. The method of claim 27 further comprising cooling the

extrudate prior to returning the extrudate to atmospheric pressure such that puffing of the extrudate is substantially inhibited.

51. The method of claim 28 wherein the heating comprises
5 frying.

52. The method of claim 28 wherein the heating comprises baking.

53. The method of claim 28 wherein the heating comprises microwave heating.

10 54. The method of claim 28 wherein the heating comprises heating in a forced air system.

55. The method of claim 28 wherein the heating comprises heating in an air tunnel.

15 56. A textured whey protein product comprising a thermoplastic extrusion product of a composition comprising about 1-80% by weight of a mixture of food grade proteins and about 20-99% by weight of an edible polysaccharide, wherein the mixture of food grade proteins comprises at least about 25% by weight of

whey protein.

57. The textured whey protein product of claim 56 wherein the composition comprises about 15-65% by weight of the mixture of food grade proteins.

5 58. The textured whey protein product of claim 56 wherein the composition comprises about 16-48% by weight of the mixture of food grade proteins.

10 59. The textured whey protein product of claim 56 wherein the mixture of food grade proteins further comprises up to about 75% by weight of plant proteins, animal proteins, microbial proteins, or mixtures thereof.

15 60. The textured whey protein product of claim 59 wherein the mixture of food grade proteins comprises plant proteins selected from the group consisting of wheat proteins, rice proteins, soy proteins, corn proteins, legume proteins, and mixtures thereof.

61. The textured whey protein product of claim 59 wherein the mixture of food grade proteins comprises wheat protein.

62. The textured whey protein product of claim 59 wherein
the mixture of food grade proteins comprises rice protein.

63. The textured whey protein product of claim 59 wherein
the mixture of food grade proteins comprises soy protein.

5 64. The textured whey protein product of claim 59 wherein
the mixture of food grade proteins comprises corn protein.

65. The textured whey protein product of claim 59 wherein
the mixture of food grade proteins comprises legume protein.

10 66. The textured whey protein product of claim 59 wherein
the mixture of food grade proteins comprises casein.

67. The textured whey protein product of claim 59 wherein
the mixture of food grade proteins comprises blood protein.

15 68. The textured whey protein product of claim 56 wherein
the mixture of food grade proteins comprises at least about 50%
by weight of whey protein.

69. The textured whey protein product of claim 56 wherein
the edible polysaccharide is a member selected from the group

consisting of starches, cellulosics, dietary fibers, and mixtures thereof.

70. The textured whey protein product of claim 69 wherein the edible polysaccharide is a starch selected from the group consisting of cornstarch, potato starch, rice starch, tapioca starch, bran starch, soy starch, modified variants thereof, and mixtures thereof.

71. The textured whey protein product of claim 70 wherein the edible polysaccharide is cornstarch.

10 72. The textured whey protein product of claim 69 wherein the edible polysaccharide is a cellulosic selected from the group consisting of celluloses, modified celluloses, and mixtures thereof.

15 73. The textured whey protein product of claim 69 wherein the edible polysaccharide is a dietary fiber selected from the group consisting of maltodextrin, inulin, fructo-oligosaccharides, pectin, guar gum, and mixtures thereof.

74. The textured whey protein product of claim 56 wherein the composition further comprises a calcium salt.

75. The textured whey protein product of claim 74 wherein the calcium salt is a member selected from the group consisting of calcium carbonate, calcium chloride, calcium gluconate, calcium lactate, and mixtures thereof.

5 76. The textured whey protein product of claim 75 wherein the calcium salt is calcium chloride.

77. The textured whey protein product of claim 56 wherein the composition further comprises a pH-adjusting agent.

10 78. The textured whey protein product of claim 56 wherein the whey protein comprises sweet whey solids.

79. The textured whey protein product of claim 56 wherein the whey protein comprises a whey protein concentrate.

80. The textured whey protein product of claim 56 wherein the whey protein comprises a whey protein isolate.

15 81. The textured whey protein product of claim 56 wherein the whey protein is a member selected from the group consisting of sweet whey solids, whey protein concentrate, whey protein isolate, and mixtures thereof.

82. The textured whey protein product of claim 56 wherein
the whey protein is undenatured.

83. A textured whey protein product comprising a
thermoplastic extrusion product of a composition comprising about
1-80% by weight of a mixture of food grade proteins and about 20-
99% by weight of an edible polysaccharide, wherein the mixture of
food grade proteins comprises soy protein and at least about 25%
by weight of whey protein.
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84. The textured whey protein product of claim 83 wherein
10 the composition comprises about 15-65% by weight of the mixture
of food grade proteins.

85. The textured whey protein product of claim 83 wherein
the composition comprises about 16-48% by weight of the mixture
of food grade proteins.

15 86. The textured whey protein product of claim 83 wherein
the mixture of food grade proteins further comprises up to about
75% by weight of plant proteins, animal proteins, microbial
proteins, or mixtures thereof.

87. The textured whey protein product of claim 86 wherein

the mixture of food grade proteins comprises plant proteins selected from the group consisting of wheat proteins, rice proteins, corn proteins, legume proteins, and mixtures thereof.

88. The textured whey protein product of claim 86 wherein
5 the mixture of food grade proteins comprises wheat protein.

89. The textured whey protein product of claim 86 wherein the mixture of food grade proteins comprises rice protein.

90. The textured whey protein product of claim 86 wherein the mixture of food grade proteins comprises corn protein.

10 91. The textured whey protein product of claim 86 wherein the mixture of food grade proteins comprises legume protein.

92. The textured whey protein product of claim 86 wherein the mixture of food grade proteins comprises casein.

15 93. The textured whey protein product of claim 86 wherein the mixture of food grade proteins comprises blood protein.

94. The textured whey protein product of claim 83 wherein the mixture of food grade proteins comprises at least about 50%

by weight of whey protein.

95. The textured whey protein product of claim 83 wherein
the edible polysaccharide is a member selected from the group
consisting of starches, cellulosics, dietary fibers, and mixtures
5 thereof.

96. The textured whey protein product of claim 95 wherein
the edible polysaccharide is a starch selected from the group
consisting of cornstarch, potato starch, rice starch, tapioca
starch, bran starch, soy starch, modified variants thereof, and
10 mixtures thereof.

97. The textured whey protein product of claim 96 wherein
the edible polysaccharide is cornstarch.

98. The textured whey protein product of claim 95 wherein
the edible polysaccharide is a cellulosic selected from the group
15 consisting of celluloses, modified celluloses, and mixtures
thereof.

99. The textured whey protein product of claim 95 wherein
the edible polysaccharide is a dietary fiber selected from the
group consisting of maltodextrin, inulin, fructo-

oligosaccharides, pectin, guar gum, and mixtures thereof.

100. The textured whey protein product of claim 83 wherein
the composition further comprises a calcium salt.

101. The textured whey protein product of claim 100 wherein
5 the calcium salt is a member selected from the group consisting
of calcium carbonate, calcium chloride, calcium gluconate,
calcium lactate, and mixtures thereof.

102. The textured whey protein product of claim 101 wherein
the calcium salt is calcium chloride.

10 103. The textured whey protein product of claim 83 wherein
the composition further comprises a pH-adjusting agent.

104. The textured whey protein product of claim 83 wherein
the whey protein comprises sweet whey solids.

15 105. The textured whey protein product of claim 83 wherein
the whey protein comprises a whey protein concentrate.

106. The textured whey protein product of claim 83 wherein
the whey protein comprises a whey protein isolate.

107. The textured whey protein product of claim 83 wherein
the whey protein is a member selected from the group consisting
of sweet whey solids, whey protein concentrate, whey protein
isolate, and mixtures thereof.

5 108. The textured whey protein product of claim 83 wherein
the whey protein is undenatured.

109. A textured whey protein product comprising a
thermoplastic extrusion product of a composition comprising about
40-100% by weight of a whey protein concentrate and about 0-60%
10 by weight of an edible polysaccharide, wherein the whey protein
concentrate comprises at least about 80% by weight of protein.

110. The textured whey protein product of claim 109 wherein
the composition comprises about 40-99% by weight of the whey
protein concentrate and about 1-60% by weight of the edible
15 polysaccharide.

111. The textured whey protein product of claim 110 wherein
the edible polysaccharide is a member selected from the group
consisting of starches, cellulosics, dietary fibers, and mixtures
thereof.

112. The textured whey protein product of claim 111 wherein
the edible polysaccharide is a starch selected from the group
consisting of corn, potato, rice, tapioca, bran, and soy
starches, modified variants thereof, and mixtures thereof.

5 113. The textured whey protein product of claim 112 wherein
the edible polysaccharide is cornstarch.

10 114. The textured whey protein product of claim 111 wherein
the edible polysaccharide is a cellulosic selected from the group
consisting of celluloses, modified celluloses, and mixtures
thereof.

115. The textured whey protein product of claim 109 wherein
the edible polysaccharide is a dietary fiber selected from the
group consisting of maltodextrin, inulin, fructo-
oligosaccharides, pectin, guar gum, and mixtures thereof.

15 116. The textured whey protein product of claim 109 wherein
the composition further comprises a calcium salt.

117. The textured whey protein product of claim 116 wherein
the calcium salt is a member selected from the group consisting
of calcium carbonate, calcium chloride, calcium gluconate,

calcium lactate, and mixtures thereof.

118. The textured whey protein product of claim 117 wherein
the calcium salt is calcium chloride.

119. The textured whey protein product of claim 109 wherein
5 the composition further comprises a pH-adjusting agent.